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March 9, 2015

Mr. Jan Greben
Greben & Associates
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Santa Barbara, California 93101

Subject: Review of *Revised Data Gap Work Plan Addendum* for former Chevron-branded service station 91723, 9757 San Leandro Street in Oakland, California

Dear Mr. Greben:

Pursuant to your request, West Environmental Services & Technology, Inc. (WEST) has reviewed the February 20, 2015 Stantec Environmental Consulting Services, Inc. (Stantec) *Revised Data Gap Work Plan Addendum* ("*Revised Work Plan Addendum*") for the former Chevron-branded service station 91723 located at 9757 San Leandro Street in Oakland, California ("the Site") submitted on behalf of Chevron Environmental Management Company. The *Revised Work Plan Addendum* presents responses to the Alameda County Environmental Health comments on the Stantec August 15, 2014 *Response to Technical Comments and Data Gap Work Plan Addendum for Chevron-branded service station 91723*.

Based on our review, the *Revised Work Plan Addendum* appears to provide a more comprehensive investigation approach to address identified data gaps. However, as explained further below, there are several data gaps and issues that are not addressed by the proposed scope of work. Specifically, the *Revised Work Plan Addendum* does not include work to provide downgradient delineation of groundwater impacts or address the noted presence of benzene in soil gas at concentrations above closure criteria.

BACKGROUND

A Chevron-branded gasoline service station operated at the Site from approximately 1947 through 1978, when the station was closed and the underground storage tanks (USTs) were reportedly removed (CRA, 2009). Two "generations" of USTs were reportedly used at the Site. The first generation USTs were removed prior to 1968 at the time San Leandro Boulevard was widened. The second generation USTs included one waste oil UST and three fuel USTs. The Site is currently used for warehouse and distribution.

During the demolition of the Site in 1978, the USTs were removed and contamination was discovered. Further work on the UST release was not conducted until 1987, when Beta Associates drilled 11 borings as part of an investigation near the Site. The soil sampling revealed benzene up to 1.063 milligrams per kilogram (mg/kg; Cambria, 2006).

In 1988, Groundwater Technology, Inc. (GTI) installed three monitoring wells on the Site (MW-5, MW-6 and MW-8). In 1989, Harding Lawson Associates (HLA) advanced eight shallow soil borings. In 1996, GTI advanced 23 borings. Soil samples revealed benzene up to 99 milligrams

per kilogram (mg/kg). Groundwater samples collected in 1996 revealed benzene up to 19,000 micrograms per liter (µg/l).

A soil vapor investigation was conducted in 1997 by Cambria Technology, Inc. (Cambria) that revealed benzene up to 319,468 micrograms per cubic meter (µg/m^3) in soil gas. However, Cambria characterized the detection of benzene "as an anomaly, and not representative of the site as a whole." Based on these findings, Delta Environmental Consultants, Inc. (Delta) prepared a "Risk-Based Corrective Action (RBCA)" Evaluation in 2001 that concluded "no further work is warranted to protect against exposure at this site."

In 2006, Cambria prepared a "Closure Request" that also concluded "petroleum hydrocarbons beneath the site present no significant current risk to human health or the environment." Based on this conclusion, Cambria on behalf of Chevron requested concurrence for No Further Action status for the Site (Cambria, 2006).

In October 2008, Alameda County Environmental Health (ACEH) required further evaluation of soil vapor conditions prior to considering the Site for closure. In response to the ACEH requirement, Chevron retained Conestoga-Rovers & Associates (CRA) in 2010 to install five vapor monitoring wells (SV-1 to SV-5). Sampling of the vapor wells in 2010 revealed benzene ranging from 3,700 µg/m^3 to 540,000 µg/m^3.

Chevron began monitoring of groundwater in September 2011 using the monitoring wells MW-2, MW-5, MW-6, MW-8 and MW-9, which had been installed in 1987 through 1989. Monitoring wells MW-1, -3, -4 and -7 were destroyed abandoned or lost (the specific are not currently known). Well construction logs are not available for MW-5, -6, 8 and 9. Monitoring well MW-2, the only well with a construction log, has had the top of its well screen consistently below the top of the groundwater table.

Groundwater monitoring conducted since 2011 has revealed benzene varying between 2 µg/l and 65 µg/l in samples from monitoring well MW-8 (located near the former second generation USTs). Samples from the other monitoring wells have not revealed the presence of benzene above the laboratory-reporting limit of 0.5 µg/l.

On January 21, 2014, representatives of ACEH and Chevron met to discuss gathering the required data to support closure of the Site pursuant to the State Water Resources Control Board (SWRCB) Resolution 2012-0016, Low-Threat Underground Storage Tank Closure Policy (LTCP), i.e., data gaps. Based on the meeting, the ACEH identified several data gaps including:

1) The lateral and downgradient extent of groundwater contamination had not been delineated;

2) Groundwater from monitoring wells MW-1 and MW-7 historically contained halogenated volatile organic compounds (HVOCs) and further investigation was needed to delineate the extent of HVOCs in groundwater;

3) The probable historical use of diesel fuel should be addressed through the addition of analysis for naphthalene and polycyclic aromatic hydrocarbons (PAHs);

4) Additional soil vapor data indicate residual shallow soil contamination not currently seen in groundwater and re-sampling of the vapor wells should include HVOCs (full) and naphthalene.

Chevron's consultant, Stantec Consulting Services, Inc. (Stantec), submitted the *Site Conceptual Model and Data Gap Work Plan* on March 31, 2014. Stantec concluded that the "additional assessment is needed to evaluate soil vapor at the Site. However, the Site is currently used as a semi-truck parking and staging area for a distribution facility and background vapors associated with the semi-trucks and visiting vehicles likely present a higher risk than vapors from residual contamination at the Site" (Stantec, 2014).

Based on these findings, the scope of data gap sampling was limited to re-sampling of the vapor wells VP-1 through VP-5. However, the proposed laboratory analysis did not include the requested HVOCs. The work plan also did not include any additional sampling for soil and groundwater.

On May 29, 2014, ACEH provided Chevron comments to the S*ite Conceptual Model and Data Gap Work Plan*. The comments included the need for the scope of work to address:

1) Likely use of diesel at the Site;

2) Historical detections of HVOCs and potential releases from waste oil UST;

3) Delineation of soil contamination;

4) Investigation of potential preferential pathways;

5) Collection of updated information on existing water supply wells; and

6) Collection of data to support evaluation of the LTCP media specific criteria for direct contact and outdoor air.

Chevron's consultant, Stantec, provided a *Response to Technical Comments and Data Gap Work Plan Addendum* on August 15, 2014. Chevron's responses included:

1) Analysis for diesel is not warranted;

2) HVOCs are not believed to be associated with the former releases associated with the Site, and are not considered a data gap;

3) The lateral extent of petroleum hydrocarbons in soil is defined;

4) There is no reason to suspect any preferential pathways;

5) There is no evidence to suspect that any abandoned UST system equipment remains on Site;

6) Site conditions meet LTCP direct contact and outdoor air exposure criteria; however, to address ACEH concerns two borings would be advanced to collect soil samples near borings SB-10 and SB-15;

ACEH had concerns with the approach and requested a meeting to discuss the scope. A meeting was held on November 7, 2014 to discuss the *Response to Technical Comments and Data Gap Work Plan Addendum*. Based on the meeting, Stantec, on behalf of Chevron, submitted its *Revised Data Gap Work Plan Addendum* on February 20, 2015 ("*Revised Work Plan Addendum*"). The *Revised Work Plan Addendum* includes a scope of work to:

1) Investigate the former waste oil UST by advancing boring SB-24 near and downgradient of the former waste oil UST for collection of soil and groundwater samples;

2) Advance eight borings to 15-feet below ground surface (SB-27 through SB-34) in the area of the highest reported soil contamination;

3) Include HVOC analysis for samples collected during the next routine groundwater monitoring event; and

4) Perform a utility survey to map potential preferential pathways.

GENERAL COMMENTS

Due to the numerous iterations of submittals (March 31, 2014, August 15, 2014 and February 20, 2015), it is difficult to ascertain the full scope of the proposed work. It is unclear whether the pending work includes the proposed soil vapor sampling as presented in the August 15, 2014 work plan. It would be helpful to have a complete work plan that outlines each of the tasks to be conducted.

SOIL VAPOR

There have been releases from the USTs identified as early as 1978. During the ensuing 37 years, no remedial actions have been conducted and soil vapor conditions remain at levels posing a potential threat to human health, i.e., benzene in soil gas at 540,000 µg/m3, which is approximately 1,900 times greater than the LTCP commercial soil gas criteria of 280 µg/m^3. Benzene was found in soil gas during sampling conducted in 1997 and at higher concentrations in 2010. Therefore, it does not appear that natural attenuation will mitigate the presence of petroleum hydrocarbon vapors at the Site within a reasonable time. Other than additional monitoring, no actions are proposed to address the noted soil gas conditions. It is unclear what data gaps exist that limit implementation of measures to address the soil gas at the Site. Therefore, it would appear appropriate at this time for Chevron to develop and implement a plan to address the soil gas contamination at the Site.

In addition, it appears that additional sampling should be conducted to delineate the extent of soil gas containing concentrations above LTCP criteria.

GROUNDWATER

We concur with the ACEH's conclusion in January 2014, that the extent of petroleum hydrocarbons in groundwater has not been adequately delineated. The wells being used for monitoring do not appear to provide adequate data to support conclusions regarding groundwater conditions.

The only monitoring well potentially located downgradient of the former dispenser islands and piping is monitoring well MW-9, which is more than 350-feet from this potential source and cross-gradient at approximately 290 degrees relative to the former dispenser islands. During the five monitoring events, the vector mean of groundwater flow direction has been calculated at 267 degrees. At a distance of 350-feet, it is unclear whether samples from monitoring well provide relevant data on the groundwater conditions downgradient of the source area(s). Further, there is no information on the construction and/or screen interval of monitoring well MW-9 that would support reliance on samples collected from this well as being representative of groundwater conditions.

Sampling at SB-24

Stantec proposes to advance boring SB-24 to a depth of 12-feet below ground surface, i.e., to 2 to 3 feet below first encountered groundwater. Given that chlorinated solvents are typically denser than water, the work scope should include sampling to investigate deeper intervals near the former waste oil UST.

Stantec also proposes to purge three casing volumes from the temporary pre-packed groundwater monitoring well in boring SB-24. It is unclear why Stantec has proposed to purge three casing volumes. The purpose of purging three casing volumes is to remove sufficient water from a well to assure that stagnant or non-representative water is removed. As the groundwater sample is to be collected from a temporary borehole, there should not be stagnant water present and the bailing is likely to cause increased turbidity and loss of volatile organic compounds (VOCs).

Due to the potential loss of VOCs with this method, the USEPA advises, "a bailer should not be used when sampling for volatile organic compounds because of the potential bias introduced during sampling."[1] Low-flow purging and sampling is the preferred method to obtain representative groundwater samples for VOC analysis.

Groundwater Delineation

The work scope should include work to address the downgradient delineation. As borings SB-27 to SB-34 will be advanced to 15-feet below ground surface, we suggest collection of groundwater samples from these borings, as this would provide additional data on the extent of groundwater conditions at the Site.

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[1] USEPA, Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers, EPA 542-S-02-001, May 2002 (USEPA, 2002).p.6.

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CLOSING

We appreciate the opportunity to review the proposed scope of work to address the releases at the former Chevron service station. Please call me at 415/460-6770 extension 208 if you have any questions or wish to discuss this further.

Sincerely,

Peter M. Krasnoff, P.E.
Principal Engineer

cc: Francis Meynard, Pamco
Mark Detterman, ACEH